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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
POLLACK, MELVIN H

ART UNIT	PAPER NUMBER
2145	

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely. ·
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>14 February 2005</u>.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-22</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-22</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>18 March 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

    1.☐ Certified copies of the priority documents have been received.

    2.☐ Certified copies of the priority documents have been received in Application No. _____.

    3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☒ Other: *see attached office action.*

DETAILED ACTION

Response to Arguments

1.   Applicant's arguments filed 14 February 2005 have been fully considered but they are not

persuasive. An analysis of the arguments is provided below. .

2.   In response to applicant's arguments, the recitation "multi-path system" has not been

given patentable weight because the recitation occurs in the preamble. A preamble is generally

not accorded any patentable weight where it merely recites the purpose of a process or the

intended use of a structure, and where the body of the claim does not depend on the preamble for

completeness but, instead, the process steps or structural limitations are able to stand alone. See

In re Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152,

88 USPQ 478, 481 (CCPA 1951).

3.   Applicant claims that DeKoning does not expressly disclose "a multipath system wherein

a host computer is coupled to a storage system via multiple physical paths... some multi-path

systems may employ load balancing techniques to select a particular physical path for

communicating an I/O request between the host and storage device. In contrast, DeKoning does

not disclose selecting a physical path for communicating an I/O request between a host and

storage device, and cannot, given that there is only one physical path available in DeKoning –

bus 252. Instead, DeKoning involves load balancing across a plurality of controllers within a

storage system, not across communication paths between a host and a storage system. In this

respect, any "paths" which may be selected in DeKoning are internal to the storage system 100,

and are transparent to the host."

4.   In response to applicant's argument that the references fail to show certain features of

applicant's invention, it is noted that the features upon which applicant relies (i.e., "load

balancing") are not recited in the rejected claim(s). Although the claims are interpreted in light

of the specification, limitations from the specification are not read into the claims. See *In re Van

Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Whether or not selecting a physical

path is transparent to the host, particularly in selection of new paths, are also not specified within

the claims.

5.   To discuss this argument, we must study the front-end load balancing configuration

within DeKoning, as depicted in Figs. 2 and 3. A storage subsystem 100 consists of two

controllers 102 and 104, and a disk array 108 comprising a set of drives 110 (col. 6, lines 53-62),

and the connecting bus may represent a single bus or a plurality of busses in combination (col. 6,

lines 65-67). Since subsystem 100 may consist of a variety of topologies (col. 8, lines 13-35),

the examiner uses as the device disk array 108 and disks 110. The host system (Fig. 2, #222) is

thus connected to the device through two multiple-path busses (Fig. 2, #150 and #252). As

stated by DeKoning, "I/O requests are exchanged directly with the controller to which the host

system directed the I/O request," i.e. controller A, which then communicates with controller B

(col. 7, lines 45-55), and this ability to choose the controller, coupled with the ability to divert

the controller, further indicates multiple paths. Otherwise, the I/O request would have to be

transmitted to both controllers, and the steps of determination and diversion could not be

performed as described in DeKoning. The multiple host system provided in Fig. 3, and used in

the claim 3 discussion, provides an even clearer indication of a multi-path bus (Fig. 3, #352)

through a variety of topologies (col. 8, lines 35-65). Furthermore, DeKoning teaches that

"controllers 102 and 104 may be distinct modules within the storage system 100 as shown in Fig.
1 or may be integrated within intelligent I/O adapters physically housed within a host system
(e.g. 220 of Fig. 2) (col. 8, lines 16-18)." Therefore, if examiner uses the I/O adapter
embodiment of DeKoning, a multi-path selection within the host is clearly taught.

6.   In response to applicant's argument that there is no suggestion to combine the references,
the examiner recognizes that obviousness can only be established by combining or modifying the
teachings of the prior art to produce the claimed invention where there is some teaching,
suggestion, or motivation to do so found either in the references themselves or in the knowledge
generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5
USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).
In this case, DeKoning and Jantz both teach I/O request processing and read/write processing
(abstracts of both) within RAID storage subsystems (DeKoning, col. 1, lines 25-30 and Jantz,
col. 1, lines 8-12) (see also Fig. 1 of both teachings). The examiner wished to use Jantz
controller to improve both portability and reliability, as stated prior. More specifically, the
examiner uses Jantz to teach greater detail of DeKoning's I/O and read/write commands, in order
to improve the portability of the RAID system (col. 2, lines 36-55). At the time the invention
was made, one of ordinary skill in the art would have used Jantz's IOCTL commands in
DeKoning in order to "simplify and standardize the host based computer programs which
manage attached RAID subsystems (col. 2, lines 61-63)."

7.   For the reasons above, the rejection is maintained, and is made final.

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

9.   Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeKoning et

al. (6,108,684) in view of Jantz (5,867,736).

10.   For claims 1, 8, 15, DeKoning teaches a method (abstract) of processing an "I/O request"

control command (col. 1, line 25 – col. 4, line 40) executed by a host computer (Fig. 2, #222) in

a multi-path system (Fig. 2, #252 and #150) including the host computer (Fig. 2, #222), a device

(Fig. 2, #108 and #110) and multiple physical paths coupling the host computer to the device

(Fig. 3, #150 and #352), the out of band control command identifying a target address in the

device (Figs. 6 and 7), the control command further identifying, from among the multiple

physical paths, a target physical path for transmission of the out of band control command

between the host computer and the device (col. 7, lines 45-60), the method comprising the steps

of:

  a.   Selecting a selected physical path for transmitting I/O control command between

  the host computer and the device, the selected physical path being selected from among

  the multiple physical paths based upon a selection criteria that enables the selected

  physical path to be other than the target physical path identified by the control command

  (col. 7, lines 45-60); and

  b.   Transmitting the control command between the host computer and the device over

  the selected physical path (col. 8, lines 5-10).

11.   DeKoning does not expressly disclose that the I/O requests comprise out-of-band control

commands that bypass at least one layer in a normal read/write path in the host computer. Based

on the definitions referenced above, the examiner interprets that the I/O request term may imply

in-band commands (read/write) or out-of-band commands (IOCTL/get/put). Jantz teaches a

method (abstract) of separating I/O functions and developing out-of-band systems for RAID

systems (col. 2, lines 20-35) such as DeKoning's, and the development of IOCTL commands to

act more like in-band commands to achieve portability (col. 1, line 5 – col. 4, line 35). At the

time the invention was made, one of ordinary skill in the art would have used used Jantz's

IOCTL commands in DeKoning in order to "simplify and standardize the host based computer

programs which manage attached RAID subsystems (col. 2, lines 61-63)."

12.   For claims 2, 9, 16, DeKoning teaches that the device is a data storage system (col. 5,

lines 10-20), wherein the control command requests access to information stored on the data

storage system (Fig. 7), and wherein the step (B) includes a step of transmitting the information

between the host computer and the data storage system over the selected physical path (Fig. 6,

#604).

13.   For claims 3, 10, 17, DeKoning teaches that the multi-path system further includes a

second computer that is coupled to the data storage system (Fig. 3, #323), wherein the data

storage system includes a shared storage region shared by the host computer and the second

computer, wherein the target address specifies the shared storage region (col. 8, lines 35-45), and

wherein the step (B) includes a step of transmitting the information between the host computer

and the shared storage region over the selected physical path (col. 11, lines 20-40).

14.   For claims 4, 11, 18, DeKoning teaches that the step (A) includes a step of selecting the

target physical path as the selected physical path when the target physical path is operational, and

selecting a different one of the multiple physical paths when the target physical path is non-

operational (Fig. 4, #400).

15.   For claims 5, 12, 19, DeKoning teaches that the step (A) further includes a step of

automatically selecting the different one of the multiple physical paths when the target physical

path is non-operational, without intervention of a system administrator (Fig. 6).

16.   For claims 6, 13, 20, 22, DeKoning teaches that the step (A) includes a step of selecting

the selected physical path based upon a selection algorithm that distributes, among the multiple

physical paths a load of operations passing between the host computer and the device (col. 9,

lines 50-55).

17.   For claims 7, 14, 21, DeKoning teaches that the step (A) includes a step of selecting the

selected physical path based upon a state of previously assigned operations queued for

transmission from the host computer to the device over the multiple physical paths (col. 5, line

40 – col. 6, line 10).

Conclusion

18.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Melvin H. Pollack whose telephone number is (571) 272-3887.

The examiner can normally be reached on 8:00-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Valencia Martin-Wallace can be reached on (571) 272-6159. The fax phone number

for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MHP
02 June 2005

VALENCIA MARTIN-WALLACE
SUPERVISORY PATENT EXAMINER